K E N T U C K Y 6 1 C A R T E R

FIELD APPRAISAL ANALYSIS

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SUMMARY AND CONCLUSION
KENTUCKY 61 CARTER

AREA CHARACTERISTICS

The population and number of farms in the service area decreased over the period 1940-1950. The average value of farm land and buildings was $4,057 per farm in 1950 and gross farm income from sale of farm products averaged $907 in 1949. Both average farm property values and average farm income were approximately one-half State averages. However, both increased at greater rates than for the State as a whole over the period 1945-1950. Tobacco is the major source of agricultural income in the area. Approximately two-thirds of the employed labor force in 1950 was outside agriculture. Nonmetallic mineral products manufacture and railroads were important sources of employment. Fire clay, coal, oil and gas are important minerals resources of the area. The construction of the Pike County, Ohio, Atomic Energy Plant approximately 25 miles to the north of the system, is expected to have some short-run effects on population and income in the service area. Topography of the area is mainly rolling to steep, interspersed with valleys. Soils range from shallow on the slopes to deeper soils of medium quality on the uplands. The growing season averages 178 days. No serious weather hazards are reported.

ESTIMATED FUTURE NUMBER OF CONSUMERS

On June 30, 1953, the cooperative had 4,608 consumers. The manager has estimated that a total of 7,000 consumers will be served in the near future. Idle services total 435, according to the manager. Population trends and survey results indicate a moderate increase in the number of idle services. This analysis leads to estimates of consumer numbers which are below those estimated by the manager, with the principal difference being in estimates of farm and nonfarm numbers.

The following estimates of consumer numbers are believed to be reasonable and may be expected to be attained in the years specified:

Class of Consumer	June 30, 1953	1955	1958	1963
Farm and Nonfarm Residential	4,081	4,400	4,550	4,700
Small Commercial[a]	289	350	380	410
Public Buildings	229	250	260	275
Street Lighting	3	4	4	5
Large Commercial	6	10	10	10
Total	4,608	5,014	5,204	5,400[b]

a/ Includes 16 cathodic units and 39 oil wells as of June 30, 1953. The estimated increases for the total class are primarily expected increases in oil well loads.

b/ The field survey indicated an estimated 639 consumer units in the service area that are presently not interested in receiving electric service. The extent to which these units become interested will tend to increase the estimated number that are likely to receive service in the future. This would provide for an estimate of approximately 6,000 consumers in 10 years if all who were not interested became interested in service.

ESTIMATED FUTURE AVERAGE CONSUMPTION OF ELECTRICITY

Since 1951 average monthly farm and nonfarm residential consumers have increased from 80 to 99 kwh for the 12 months ended June 1953. Served farm and nonfarm consumers indicated a 29 percent increase in average usage within 3 years. Use of gas is reported by 19 percent of the respondents, with an additional 4 percent planning to use gas. A majority of respondents will be paying 3¢ or more per kwh based on present electric rates. The cooperative is developing a power use program which can be expected to encourage greater consumption of electricity. Opinions of local farm leaders tend to support the indications of consumers regarding future consumption. Low levels of farm income and types of farming in the area indicate a lower limit to potential consumption compared with nearby areas in Kentucky, although the rate of economic expansion appears to be greater than for the State as a whole.

Based on factors believed to be significant, this analysis leads to the following estimates of average kwh consumption which are certified as being reasonable and may be expected to be attained in the years specified:

Class of Consumer	12 Months Ended June 1953	1955	1958	1963
Farm and Nonfarm Residential	99[a]	125	150	185
Small Commercial	250	280	325	390
Public Buildings	37	50	60	75
Street Lighting (annual)	6,108	6,400	6,700	7,000
Cathodic Units (annual)	9,180	9,200(2kw)	9,200	9,200
Oil Wells (annual) (2.5 HP)	1,644[b]	1,650	1,650	1,650
Large Commercial (annual)				
Copley and Fry Coal Co.		(75kw) 75,000	75,000	75,000
Raybourn Speedway (4 mo.)		(25kw) 4,000	4,000	4,000
Rainbow Oil Production Corp.		(50kw) 150,000	150,000	150,000
Sandy Hook High School		(40kw) 40,000	40,000	40,000
Sandy Hook High School Gym		(160kw) 30,000	30,000	30,000
Carter Caves Park		(95kw) 170,000	(150kw) 235,000	(200kw) 300,000

Class of Consumer	1955	1958	1963
Large Commercial (cont'd)			
Daviscourt and Schafer(oil lease)(potential)	(55kw) 200,000	200,000	200,000
Rock Crusher (potential)	(150kw) 225,000	225,000	225,000
Water Flooding Oil Projects (potential)	(30kw) 100,000	100,000	100,000
Standard Slag Company(rock crusher)(potential)	(50kw) 75,000	75,000	75,000

a/ Present average consumption by nonfarm residential consumers is comparable to the combined average as shown. Served nonfarm respondents have indicated an increase in 3 years of but 2 percent as compared with a 29 percent increase indicated by the combined class.

b/ Based on 6 months ended June 1953.

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October 2, 1953

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ANALYSIS OF BASIC FACTORS RELATED TO THE FUTURE CONSUMPTION OF ELECTRICITY KENTUCKY 61 CARTER

This analysis of basic factors related to future consumption of electricity by consumers of the Grayson Rural Electric Cooperative Corporation, with headquarters at Grayson, Kentucky (Figure 1), is based on a field study conducted by Robert B. Williamson, Business Economist, during July 1953. Mr. Williamson also prepared this analysis. The field work consisted primarily of interviews with 113 served farm and nonfarm residential consumers. In addition, unserved farm and nonfarm families and served and prospective consumers in other classes were interviewed.1/ Businessmen, bankers and agricultural leaders, including directors of the cooperative, were consulted regarding local economic trends and their estimates of the future of the area with respect to the use of electricity. Supporting economic data were obtained from the U. S. Census for Carter, Elliott and Greenup Counties and from other secondary sources.

NATURE OF PRESENT AND INDICATED FUTURE NUMBER OF CONSUMERS

On June 30, 1953, the cooperative was serving 4,608 consumers of which 4,081 were farm and nonfarm residential, 233 small commercial, 39 oil wells, 16 cathodic units of the Tennessee Gas Transmission Company, 229 schools and churches, 3 public street lighting, and 7 large power (as classified by the cooperative).

The manager has indicated in a letter dated July 14, 1953 (Figure 2), that he expects to serve 7,000 consumers by 1963. A power requirements study completed for this system in April 1953, estimated that a total of 6,564 consumers will be served by 1963.

A total of 435 idle services presently existing was reported by the manager in a letter to this office dated July 17, 1953. According to the manager this number includes prospective consumers built to but not connected and disconnected consumers.

The number of various classes of consumer units as disclosed by an expansion of the sample data is compared with the manager's estimates in Table I. Sample data were corrected to the numbers of presently served consumers for farm and nonfarm residential consumers and other classes were adjusted accordingly.

1/ Respondents in the survey were randomly selected and comprise an area sample of approximately 2.8 percent of the consumer units existing in the area.

TABLE I

DISTRIBUTION OF CONSUMER UNITS WITH RESPECT TO ELECTRIC SERVICE

Class	Number In Random Sample	Expanded Number[a]	Manager's Estimate
Served			
Farm and Nonfarm Residential	115	4,081[b]	4,081
Small Commercial)	10	355	288[c]
Public Buildings)			229
Street Lighting	--	--	3
Large Commercial	--	--	7
Potential			
Farm and Nonfarm Residential	11	390	2,204
Small Commercial)	1	35	122
Public Buildings)			46
Street Lighting	--	--	2
Large Commercial	--	--	18
Subtotal	137	4,861	7,000[d]
Other			
Idle Services	19	674	435
Potential Reconnects	(2)[d]	(71)[e]	--
Unserved Not Interested	18	639	--
Vacant--No Service Run	16	568	--
Subtotal	51	1,810	435
Total Units	188	6,671	7,435

a/ Derived by expanding sample data by reciprocal of the adjusted sampling rate.
b/ It is estimated from the survey data that approximately 17 percent or 700 of this class are rural-nonfarm residences.
c/ Includes oil wells and gas company loads not in large commercial.
d/ Estimated number to be receiving service in 10 years.
e/ Included in potential farm and nonfarm residential.

NATURE OF PRESENT AND INDICATED FUTURE AVERAGE KWH CONSUMPTION

A tabulation of the raw data secured from respondents revealed the monthly consumption figures shown in the following table.

TABLE II

INDICATED MONTHLY KWH CONSUMPTION[a]/

Consumer Class	Present	Future[b]/	Percent Increase
Farm and Nonfarm Residential	132	170	29

a/ Based on indications of served respondents in the survey and average energy requirements as determined by REA for the country at large.
b/ Based on what respondents expect to add in 3 years.

It should be noted that respondents actually averaged 79 kwh per month during 1952. Thus, it appears that farm and nonfarm residential consumers in this area use only 60 percent of the average usage of appliances as determined by REA for the country at large.

Potential consumers indicated that they planned to obtain a sufficient number of appliances and equipment to attain an unadjusted average of 60 kwh per month. Based on the indications of all served and potential farm and nonfarm residential consumers in the survey, indicated future usage is 161 kwh per month or an increase of 22 percent over indicated present usage.

Historical consumption records for consumers in the survey indicated a generally rising average consumption. The increases in average consumption for all respondents have been more moderate than for the individual age groups. This is a result of the addition of new consumers with low initial consumption. Initial averages have been at about the same level for each new group of consumers added over the period. Records being maintained by the cooperative of a group of consumers continuously served since electricity was made available in the area show average consumption similar to that of the oldest group in the survey. Consumption averages for consumers in the survey are shown in Table III.

TABLE III

AVERAGE MONTHLY KWH CONSUMPTION OF 96 FARM AND NONFARM RESIDENTIAL CONSUMERS[a]/

Years of Service	Number In Group	Average Monthly KWH Consumption						
		1946	1947	1948	1949	1950	1951	1952
7 or more	15	47	48	70	95	112	151	185
6	13	--	42	63	77	72	93	98
5	3	--	--	29	42	44	42	55
4	16	--	--	--	43	65	83	99
3	10	--	--	--	--	30	46	69
2	24	--	--	--	--	--	33	43
1	15	--	--	--	--	--	--	42
Weighted Average		47	45	63	70	72	70	79

a/ Records of consumption not available for years prior to 1946.

A saturation of electrical appliances and equipment measured in terms of the percent of consumers presently having them and a corresponding percent anticipated in the future was compiled from field schedules. The difference in saturation was converted to indicated future kwh requirements per 100 consumers for each appliance and piece of equipment. This is shown in Table IV.

TABLE IV

PRESENT AND INDICATED SATURATION OF ELECTRICAL APPLIANCES AND EQUIPMENT AND CORRESPONDING INDICATED INCREASE IN KWH USAGE FARM AND NONFARM RESIDENTIAL CONSUMERS, COMBINED a/

Appliance or Equipment	Percent of Consumers		Increase	
	Presently Using	Indicating Future Use	Percentage Points	KWH Usage (Per 100 Consumers) b/
Battery Charger	1	1	--	--
Brooder (Hover)	4	5	1	189
Brooder (Pig)	1	1	--	--
Churn	13	13	--	--
Clock	21	22	1	17
Corn Popper	1	1	--	--
Drill Press	3	5	2	22
Electric Razor	1	1	--	--
Fan (Household)	29	34	5	93
Feed Chopper	--	1	1	11
Fly Killer	1	1	--	--
Fence	2	3	1	45
Food Mixer	2	3	1	23
Freezer (Home)	3	12	9	3,150
Gasoline Pumps	--	2	2	54
Garden Watering	1	1	--	--
Hair Clippers	1	1	--	--
Heating Pad	3	3	--	--
Hot Bed	1	1	--	--
Hot Plate	24	26	2	126
Iron	92	94	2	180
Lighting:				
Beef Cattle Barn	2	2	--	--
Cave or Spring House	2	2	--	--
Dairy Barn	2	2	--	--
Garage	3	4	1	6
General Barn	8	14	6	170
Grain & Feed Storage Building	1	2	1	2

Appliance or Equipment	Percent of Consumers Presently Using	Percent of Consumers Indicating Future Use	Increase Percentage Points	Increase KWH Usage (Per 100 Consumers) b/
Lighting (cont'd)				
House Lighting	98	100	2	624
Milk House	1	1	--	--
Other Buildings	14	15	1	22
Poultry Brooder House	1	1	--	--
Poultry Laying House	1	1	--	--
Shop	--	1	1	11
Tobacco Barn	2	3	1	8
Yard	7	8	1	16
Livestock Watering	1	1	--	--
Milk Cooler	3	3	--	--
Milk Pasteurizer	1	1	--	--
Milking Machine	1	1	--	--
Oil Furnace	1	1	--	--
Percolator	10	11	1	54
Power Saw	2	3	1	10
Pressure System (Less than 22')	1	8	7	1,278
Pres. System (Greater than 22')	8	19	11	2,736
Radio	86	87	1	90
Range	16	26	10	11,760
Record Player	1	1	--	--
Refrigerator	81	91	10	3,492
Roaster	1	1	--	--
Seed Cleaner	1	1	--	--
Sewing Machine	5	7	2	18
Sheller, Corn	1	1	--	--
Soldering Iron	4	5	1	14
Space Heater (Portable)	4	4	--	--
Television Receiver	20	27	7	2,232
Toaster	17	17	--	--
Tobacco Curing	--	1	1	16
Tool Grinder	2	6	4	110
Vacuum Cleaner	19	22	3	54
Ventilator (Window)	3	5	2	90
Waffle Iron	3	3	--	--
Washing Machine	86	89	3	94
Water Heater with Bath	4	13	9)	19,160
Water Heater without Bath	10	6	-4)	
Welder	--	1	1	68

a/ Based on 113 usable field schedules for served respondents.

b/ Based on average energy requirements as determined by REA. Data reflect instances of more than one of the same appliance per consumer.

ECONOMIC CHARACTERISTICS

The service area is located near the northeastern border of Kentucky and covers most of Carter, Elliott, and Greenup Counties and portions of Lawrence, Lewis and Rowan Counties (Figure 1).

The total population and the number of farms in this area increased over the period 1920-1940 and decreased over the period 1940-1950. Population and farms also declined over this recent period relative to numbers in the State as a whole. Population decrease was the result of a 29 percent decline in farm population. This accompanied a 25 percent decrease in numbers of farms. Nonfarm and urban population increased 22 percent, while total population declined 8 percent over the 1940-1950 period. Total population of the area, as indicated by school census data, has continued to decline. Only Greenup County showed an increase in population for the 12 months ended April 1, 1953.

In 1950 the farm population comprised 46 percent of the total, rural-nonfarm 47 percent, and urban 7 percent. Agriculture accounted for approximately one-third of the employed labor force in 1950. Manufacturing, mainly nonmetallic mineral products, accounted for 16 percent of the total, railroads 17 percent, mining 5 percent, construction 4 percent, and miscellaneous trade, services, and professions the remainder.

Farms in the area averaged 93 acres in 1950. They were valued at $4,057 per farm or approximately one-half the State average. Average income from all farm products sold by area farms in 1949 was $907. Over the period 1945-1950, average farm values and income in the area increased at greater rates than for the State as a whole, although the absolute increases were in both cases only about three-fourths of the increases for the State.

The major portion, or about two-thirds, of the agricultural income in the area is accounted for by field crops, principally tobacco. Next in importance are cattle and hogs, together accounting for about one-sixth of total farm income. Dairying and poultry account for about 5 percent each. Off-farm employment for 100 days or more in 1949 was reported by 29 percent of the farmers. Full or part ownership of farms was reported by almost 90 percent of the operators.

Banks visited in the service area reported recent increases in loans and deposits, while the local Production Credit Association reported a decline in its loans. Available data indicate a ratio of loans to deposits of 1.0 to 2.3 in 1950 for banks serving the rural areas. Banks visited reported loans for farm machinery important and increasing. Banks also reported loans for electrical equipment. Lumber companies and builders are providing some credit for home construction. The Production Credit Association at Flemingsburg reported a small decline in its number of new loans in the service area. For the over-all area served by this association, the amounts of new loans and of loans outstanding also showed some decline in the first 6 months of 1953 compared with the same period of 1952. Delinquencies were reported to be unimportant. The Farmer's Home Administration at Morehead with its different lending criteria reported a higher delinquency rate than other credit institutuions visited.

TABLE V

ECONOMIC TRENDS RELATED TO THE RATE OF INCREASE IN USE OF ELECTRIC POWER

Item and Relationship	Trend					
Basic Economic Trends						
Population	1920	1930		1940		1950
Service Area	51,423	55,964		59,175		54,531
State of Kentucky	2,416,630	2,614,589		2,845,627		2,944,806
Ratio Area to State	.0213	.0214		.0208		.0185
Number of Farms	1920	1930	1935	1940	1945	1950
Service Area	6,204	5,851	7,127	6,439	6,067	4,827
State of Kentucky	270,626	246,499	278,298	252,894	238,501	218,476
Ratio Area to State	.0229	.0237	.0256	.0255	.0254	.0221
Average Income From All Farm Products Sold		1929		1939	1944	1949
Service Area		$318		$187	$ 537	$ 907
State of Kentucky		$688		$507	$1,416	$1,909
Ratio Area to State		.46		.37	.38	.48
Average Value of Farm Land and Buildings		1930	1935	1940	1945	1950
Service Area		$2,214	$1,101	$1,446	$1,891	$4,057
State of Kentucky		$3,535	$2,229	$3,070	$4,259	$7,192
Ratio Area to State		.63	.49	.47	.44	.56
Power Cost and Power Use Trends						
Cost of Purchased Power	1942	1945	1950	1951	1952	
Kentucky 61 Carter	--	--	--	1.11¢	1.11¢	
Neighboring Co-op	1.12¢	1.06¢	1.00¢	0.97¢	0.94¢	
Average Monthly KWH Consumption Per Farm Consumer	1942	1945	1950	1951	1952	
Kentucky 61 Carter	--	--	--	80	92	
Neighboring Co-op	48	54	87	104	119	

Farm facilities data for 1950 indicate 63 percent of the farms with central station electricity and 3 percent with telephones. U. S. Highway 60 and State highways provide an adequate framework for road transportation. County roads are being improved, but access to farms remains difficult in many cases. The Chesapeake and Ohio Railroad serves the area, connecting it with the larger market centers of Ashland and Lexington, Kentucky.

Among the important trade centers in the area are: Grayson, headquarters town of the cooperative and county seat of Carter County; Olive Hill, a manufacturing and market center; Greenup, county seat of Greenup County; Fullerton, trade center south of Portsmouth, Ohio; Morehead, education and manufacturing center and county seat of Rowan County; and Sandy Hook, which is served by the cooperative and is the county seat of Elliott County. Except for Morehead with a 1950 population 3,102 and Sandy Hook with an estimated population of 184, these towns had populations of around 1,400 in 1950.

There were 23 manufacturing establishments in the three counties of Carter, Greenup and Elliott in 1947. The establishments classified as stone, clay and glass accounted for the largest number of employees. Other important groups of manufacturing establishments included those in the chemicals and fuel class and those classified as lumber and lumber products. Over the period 1939-1947, manufacturing establishments increased 53 percent in the area, compared to a 37 percent increase for the State. Over the same period, the total number of wholesale, retail and service establishments decreased 22 percent in the area and decreased 8 percent in the State as a whole.

Mineral resources of the area include fire clay, glass sand, limestone, asphalt, bituminous coal, oil, gas, siderite and brown iron ore. Several fire clay deposits have been developed and are supplying refractories in the area. Glass sand production is found in the Olive Hill District, which includes Carter and Rowan Counties. Several limestone quarries are being operated in the area. Carter County, with 573,582 tons production in 1950, was twenty-first among the coal-producing counties in Kentucky. Coal production is also reported for Elliott, Greenup, and Lawrence Counties. Oil production of 187,652 barrels in 1951 was reported for Elliott and Lawrence Counties. Over the period 1949-1951, oil wells completed averaged 13 per year and new gas wells 1 per year in these counties. Production increased 14 percent over the period. No new wells since 1949 were reported for other counties in the service area.

Approximately 25 miles north of the service area the Pike County, Ohio, Atomic Energy Plant is under construction. This project, expected to cost over one billion dollars, is scheduled for completion the latter part of 1956. In May 1953 approximately 3,500 construction workers were on the job. By the summer of 1954, the labor force is expected to reach 30,000. However, this employment peak is to be of short duration, and the average labor force during construction is expected to be about 17,000. For operation the plant will need an estimated 4,000 employees. The Atomic Energy Commission is not establishing a community as it has for other projects, and trailers and new private housing units near the project site are presently providing

for most of the employees. Pike County, Ohio, with a total population of about 15,000, cannot expect to accommodate all the construction workers to be employed. However, the Portsmouth-New Boston, Ohio, area with a population of over 40,000 can absorb most of the workers. The northern boundary of the service area below South Portsmouth and Fullerton, Kentucky, is expected to be on the fringe of the expansion in economic activity and some increases in employment, income and population are already occurring in this area. These effects should diminish after completion of plant construction in 1956.

PHYSICAL CHARACTERISTICS

The area is a portion of the lower dissected Appalachian Plateau. Its topography is mainly rolling hills and mountains interspersed with valleys. Elevation of most of the area lies between the limits of 500 and 2,000 feet. Soils on the steeper slopes are shallow. Some land of this character is in brushy pasture of poor quality and where cleared there has been considerable erosion. The deeper soils of the uplands are only of medium quality as cropland, but this land has been used for corn, hay, small grains, and tobacco. In many parts of the area, cropping is largely confined to stream terraces and bottom lands.

The average length of growing season is 178 days. Average temperatures are approximately 35° for January and 75° for July. Average annual precipitation is 39 inches at Grayson. Generalized data and reports of local farm leaders indicate few climatic hazards to farming.

ANALYSIS OF FUTURE NUMBER OF CONSUMERS

The 7,000 consumers the manager expects by 1963 (Figure 2) represents an increase of 2,932 consumers or 72 percent over the number served as of June 30, 1953. Numbers of existing potential consumers indicated by the appraisal (Table I) and trends in population and numbers of farms and commercial establishments do not support this expectation. However, particular types of consumers, such as oil wells, and certain areas, particularly the area nearest the atomic energy development, will probably experience greater expansion than for the system as a whole. In general, addition of new consumers will be partially offset by consumer disconnections, if recent trends continue.

The manager has estimated 6,285 farm and nonfarm residential consumers by 1963, or an increase of 2,204, compared to 390 existing potential consumers indicated by the appraisal. The prospect of a net increase in consumers of this type resulting from increased population is not indicated by past trends. The number of potential nonfarm consumers will probably show an increase. Nonfarm population and employment opportunities have been upward. The opinions of local leaders tend to support an estimate of about 400 additional farm and nonfarm residential consumers. According to the president of the cooperative, the utility which serves the area in Kentucky just below Portsmouth, Ohio, has estimated 700 new families on the Kentucky side of the Ohio River within the next 2 years with 200 of these to be in the cooperative's area. It is estimated that these new consumers resulting from the atomic energy

development near that area will be in addition to the 400 previously referred to. However, more than 200 additional consumers as a result of this development does not appear likely in view of the employment schedule of the atomic project and the location of the service area with respect to the project.

The manager's estimate of 410 small commercial consumers including oil well pumping and gas line cathodic units represents an increase of 122. The appraisal sample was not designed to adequately reflect nonrural and nonresidential consumers, and its indication of potential consumers in these classes is not reliable. Trends in numbers of commercial establishments in the area have been downward. On the other hand, material submitted by the manager and secondary data tend to support the manager's estimate of numbers in the small commercial class based on increases in oil well pumping classified as small commercial consumers.

In view of population trends, only a moderate net increase in the number of schools and churches is indicated. The manager's estimate of 275 public buildings in 1963, while appearing to be optimistic, is within reason as is the estimate of 5 street light consumers. This appraisal provides estimates for 10 large power consumers. This number differs with the 25 estimated by the manager because of some difference in definition of this class and the appraisal number includes only potential consumers in this class which are definite prospects at present.

Most of the increases in numbers of consumers is expected to occur during the next few years. The cooperative, which was formerly a part of Kentucky 52 Fleming, has concentrated on extending service in the area since it became a separate system in January 1951 and this effort is expected to continue. Existing potential farm and nonfarm residential consumers probably will be connected as soon as possible. In addition, the major influence of the atomic energy development will come within the next 1 to 3 years and the increase in oil well pumping loads appears to be developing rapidly.

During the appraisal, unserved farm and nonfarm respondents indicated their primary reasons for not having or not planning to have electricity as follows:

Reason for Not Having Electricity	Percent of Unserved Respondents[a/]	
	Potential	Not Interested
Unable to afford	37	18
House not worth wiring (for self or tenants)	9	41
Expected to move	9	27
Have not had time	18	—
Awaiting line extension	9	--
Right-of-way disagreement	9	--
Other reasons	--	5
No reason given	9	9
Total	100	100

a/ Based on replies of 11 potential consumers and 22 respondents not interested in electric service, including respondents with idle services.

Not reflected in the preceding data are the vacant and abandoned places. The survey indicated 95 percent of all idle services were of this type. The indication of other vacant and abandoned places is shown in Table I.

According to the manager, there are 435 idle services including both consumers built to and never connected and disconnected consumers. Expanded sample data indicates over 600 units with services run but not connected. Numbers of idle services have increased from 260 in January 1951. Based on 435 idle services at present, this represents an increase of 68 idle services per year. Operating reports indicate reconnections over disconnections at the rate of 36 net reconnections per year over the same period. The apparent explanation for an increase in idle service while net disconnections decreased is that services run but never connected are not included in the operating report data and are the cause of the increase in idle services. Past decreases in farms and commercial establishments, if continued, would be a factor tending to increase the number of idle services. However, assuming that most of the decrease in total units in the area would be among the unserved, the future number of idle services should show only a moderate increase. The cooperative is concerned with this problem and has begun an active program to encourage the wiring of unwired houses to which a line has been constructed and it has adopted the policy of not extending service until houses are properly wired.

ANALYSIS OF FUTURE AVERAGE MONTHLY KWH CONSUMPTION

Consumption Trends

Historical consumption records for consumers in the survey show average monthly consumption has increased 5 kwh per year over the period 1946-1952. This increase in the average for the total group reflects the depressing effects on average use of adding new consumers at low consumption levels. Average monthly consumption of the oldest age group in the survey increased 23 kwh per year and the next oldest group 11 kwh per year. Prior to January 1951 this system was a part of another cooperative. Average monthly farm and nonfarm residential consumption of the combined system increased from 54 kwh in 1945 to 109 kwh in 1952 or an average increase of 8 kwh per year. This latter trend, based on a large number of consumers in the general area and covering a period of 7 years, is perhaps the most reliable indication of the long-term trend for this cooperative.

Since 1951 when this system became a separate cooperative, the average monthly consumption of farm and nonfarm residential consumers has increased from 80 to 99 kwh for the 12 months ended June 1953. This is an increase in average monthly usage of 12.5 kwh per year and at this rate of increase average monthly consumption would reach 137 kwh by mid-1956. Over the period December 1951 to June 1953, the number of farm and nonfarm consumers increased 21 percent.

Indicated Consumption

Served farm and nonfarm consumers indicated a 29 percent increase in usage within 3 years. Including potential consumers the indicated increase was 22 percent.

Applied to the present consumption average for the over-all class, average monthly consumption within 3 years would be 128 kwh for presently served consumers and 121 kwh with the addition of potential consumers. Considering the effects of past and future consumer additions, the survey results and recent consumption trends indicate average monthly consumption will be between 121 and 137 kwh by mid-1956.

Other factors that must be considered in arriving at future estimates of electric consumption are: (1) the extent gas usage is likely to continue in the area; (2) the effect of electric rates; (3) the extent to which power use promotion is likely to overcome consumer attitudes and economic factors limiting consumption; (4) the opinions of agricultural leaders in the area; and (5) economic trends.

Gas Competition

LP gas is used by 15 percent and natural gas by 4 percent of the served respondents. An additional 4 percent plan on using gas. None reported plans to convert from their present uses of gas to electricity. The present uses of gas are shown in Table VI. Planned uses include cooking and water heating. Other competitive fuels in use are wood, oil and coal.

TABLE VI

STATUS OF GAS USE, 113 RESPONDENTS REPORTING IN RANDOM SAMPLE SURVEY[a]

Consumers' Position With Respect to Use of Gas	Number in Survey	Percent of Total
Not using and not planning to use	87	77.0
Not using but planning to use	4	4.0
Presently using	22	19.0
		100.0
Cooking	20	
House Heating	4	
Refrigeration	1	

a/ All served respondents indicating status with respect to use of gas.

Rates

The cooperative's present domestic farm and home retail rate schedule is as follows:

First 25 kwh or less $2.50
Next 25 kwh @ 6¢ per kwh
Next 50 kwh @ 3¢ per kwh
Next 100 kwh @ 2.5¢ per kwh
Next 200 kwh @ 2¢ per kwh
Over 400 kwh @ 1.5¢ per kwh

Reported under consideration is an increase of the minimum charge to $3.00 for 25 kwh or less per month. A decrease of a few mills in wholesale power costs with service from Kentucky 59 Fayette is anticipated. At present, gas competition is a deterrent to electric power uses, and electric retail rates in the lower consumption brackets appear to be too high to actively encourage greater use by minimum consumers.

An indication of the frequency distribution of future consumption by presently served consumers reveals that the majority will be paying 3¢ or more per kwh based on the present rate schedule.

TABLE VII

FREQUENCY DISTRIBUTION OF FUTURE MONTHLY FARM AND NONFARM KWH CONSUMPTION[a]

Average Monthly Consumption	Percent of Served Respondents
25 and under	2
26 - 50	7
51 - 100	44
101 - 200	29
201 - 400	16
Over 400	2

a/ Based on indications of 113 served consumers adjusted by actual consumption for all farm and nonfarm consumers.

It should be pointed out that the data presented in Table VII are based on an adjustment of respondents' indicated use. This adjustment corrects the indicated use data for the actual average of the entire class but probably does not adequately reflect the future number of small users. Based on actual use of sample consumers, 8 percent used an average of 25 kwh or less per month during 1952 and 25 percent used 26 to 50 kwh per month.

Power Consumption Program

The effects of the cooperative's power use program on future consumption is difficult to evaluate at its present stage of development. This program is described by the manager in a letter to this section, dated July 14, 1953:

> "We are now concentrating on load building and member education. We have entered into the Kentucky Plan whereby we expect to double our consumption in the next 2 years. We have also entered into the Nash-Kelvinator promotional program for 90 days on a free range installation for every interested member. We have executed the note with REA to borrow $50,000 for the Section 5 Installation Loans for our members. We have good dealer relationship with all dealers in our area. I point out to all appliances manufacturers that we are a virgin territory and the promotion of sales in our territory is greater than any other area in the REA program. We expect to see the sale of 1,000 ranges in the next several months. Also, the addition of many water heaters."

In discussion, the manager reported a recent meeting of dealers in connection with the Kentucky Plan, a cooperative State-wide power use program. Thirty-four were reported present and agreeable. At the time of the appraisal, one dealer was ready to take part in the Nash-Kelvinator range promotion program, and a meeting was scheduled to enlist the participation of others. The Nash-Kelvinator range sales program is reported to involve a period of free trial by the consumer, a gift of kitchen equipment with the purchase, and an installment payment plan. The cost of this program is reportedly shared by the participating local dealers. The manager indicated the cooperative planned to employ a home economist for 90 days in connection with the Nash-Kelvinator program. An active program of public relations and advertising was also reported to be in progress.

While the power use program was not fully in operation at the time of the appraisal, it is evident that the plan is being developed. The cooperative has one employee at present assigned to power use activities. This employee inspects consumer house wiring, assists in remedying consumer appliance problems and service complaints, serves as representative of the cooperative in the area where he lives, maintains records of appliance additions and potential consumers of all classes, and apparently assists the manager in a wide range of other duties. The manager appears to be active in community and appliance dealer relations.

Additional ranges and water heaters are expected by the cooperative to account for much of the increase in usage resulting from the power use program. Records maintained by the cooperative show approximately 165 range and water heater circuits installed over a period of 16 months ended in July 1953. This is not a complete record of all additions according to the manager. However, at this rate approximately 375 such circuits would be installed in 3 years. This compares with 400 ranges and approximately 200 water heaters to be added within the next 3 years based on indications of served consumers in the survey. In addition to the net increase of

200 water heaters, a replacement of 180 existing heaters with larger units was indicated. Based on the sample, 650 ranges and 580 water heaters of all types are in use at present.

Of possible use as a guide in conducting the power use program was the indication of consumer attitudes toward using more electricity. During the appraisal, respondents indicated their primary reasons for not using more electricity as follows:

Reason for Not Using More Electricity	Percent of Consumers
Cannot afford more	49
Using all we want	25
Rates are too high	7
Planning to move	4
Have not had time	4
Other reasons	3
No reason given	8
Total	100

For an effective power use program, assistance in financing appliances and member education regarding the economy of electricity are indicated as important by respondents' attitudes. Generally consumers were referring to the initial cost of appliances when they said "We cannot afford more." Specific mention of rates is shown separately above. The significant proportion of respondents which stated they did not want or need more electrical equipment indicates a good opportunity for power use education. The cooperative's power use program is considered in this analysis as a factor encouraging power use. It should tend to offset other factors which limit the level of average use. Should future consumption exceed the estimates of this analysis, it might be considered that this greater use was the result of effective power use promotion techniques and of energetic management.

Opinions of Local Leaders and Economic Trends

Expected usage within 3 years of about 140 kwh per month based on preliminary tabulation of respondents' indications was discussed with local leaders. The opinion of these people was that expected usage of about 140 kwh per month within 3 years was reasonable. On the one hand, comments were made regarding the large number of low-use consumers and on the other was the opinion that appraisal indications of ranges to be added was conservative. Another comment was that the power use program was not fully in operation.

Based on economic trends and developments, increases in consumption are indicated to be at a greater rate than for the State as a whole but lower in terms of absolute kwh. The income, size and type of area farms suggest a lower limit in potential electric consumption compared to the State as a whole. Much of the potential increase in farm and residential consumption will depend on nonfarm employment opportunities.

Nature of Future Farm and Residential Consumption

Considering the several factors believed to affect future consumption of electricity in this area, it is estimated that within 3 years the increase in average usage indicated by served respondents and adjusted for appliance usage in the specific area will be achieved by all consumers. Estimated kwh increases and total usage for major uses to be achieved by mid-1956 are shown in Table VIII. The addition of six major home appliances is expected to account for 95 percent of the increase.

TABLE VIII

INDICATED AND ESTIMATED KWH USAGE, FARM AND NONFARM CONSUMERS BY CHARACTER OF LOAD PER 100 CONSUMERS, 1956

Use	Indicated			Estimated KWH[a/]		
	Future Saturation	KWH Increase	Percent of KWH Increase	Increase	Present	Future Total
Major Household Uses						
Water Heater	19	19,160	42	14,426	14,817	29,243
Range	26	11,760	25	8,854	14,365	23,219
Pressure System	27	4,014	9	3,007	1,568	4,575
Refrigerator	91	3,492	7	2,629	22,551	25,180
Freezer	12	3,150	7	2,372	6,030	8,402
Television	27	2,232	5	1,681	5,529	7,210
Miscellaneous		2,237	5	1,698	54,685	56,383
Total--annual usage per 100 consumers		46,045	100	34,667	119,545	154,212
Estimated increase (total) annual usage per consumer				347		1,542
Estimated increase (total) monthly usage per consumer				29		128

a/ Adjusted to take into account that appliance usage and amount of electricity required is only 60 percent of average for United States as determined by REA, and average consumption of respondents was 82 percent of average for all consumers.

Other Classes of Consumers

Other classes of consumers served by the cooperative accounted for 19 percent of total kwh sales during the 12-month period preceding the appraisal. The monthly averages for each of these classes were as follows:

Class of Consumer	KWH Average 12 Months Ended June 1953 Monthly	KWH Average 12 Months Ended June 1953 Annual	Estimated Future Maximum KW
Small Commercial (total class)	260	3,120	--
Small Commercial (stores, etc.)	250	3,000	--
Cathodic Units	765	9,180	2
Oil Wells (2.5 HP)	137[a]	1,644[a]	--
Public Buildings	37	444	--
Street Lighting	509	6,108	--
Large Commercial (total class)	2,626	31,512	--
Copley & Fry Coal Co.	3,800[b]	45,600[b]	75
Raybourn Speedway	12[c]	144[c]	25
Rainbow Oil Corp.	--	--	50
Sandy Hook High School	908	20,893	40
Sandy Hook High School Gym	40[d]	480[d]	160
Carter Caves Park	5,242	62,900	200
Large Commercial--Potential			
Daviscourt & Schafer (oil)	--	--	55
Rock Crusher	--	--	150
Water Flooding Oil Projects	--	--	30
Standard Slag Co.	--	--	50

a/ Based on 6 months ended June 1953.
b/ Based on 9 months.
c/ Based on 11 months.
d/ Based on 1 month.

Including farm and nonfarm consumers the system monthly average per consumer for the 12 months ended June 1953 was 108 kwh.